

August 7, 2006

Mr. Christopher M. Crane
President and Chief Nuclear Officer
Exelon Nuclear
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

**SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2 TRIENNIAL FIRE PROTECTION
BASELINE INSPECTION NRC INSPECTION REPORT
05000456/2006009(DRS); 05000457/2006009(DRS)**

Dear Mr. Crane:

On June 30, 2006, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Braidwood Station. The enclosed report documents the inspection findings which were discussed on June 30, 2006, with Mr. K. Polson and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. Specifically, this inspection focused on the triennial fire protection baseline inspection.

Based on the results of this inspection, the NRC identified three findings of very low safety significance (Green) involving violations of NRC requirements. However, because of their very low safety significance and because they were entered into your corrective action program, the NRC is treating these findings as Non-Cited Violations consistent with Section VI.A of the NRC Enforcement Policy.

If you contest the subject or severity of a Non-Cited Violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Fermi 2 Nuclear Power Plant.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any), will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Julio F. Lara, Chief
Engineering Branch 3
Division of Reactor Safety

Docket Nos. 50-456; 50-457
License Nos. NPF-72; NPF-77

Enclosure: Inspection Report 05000456/2006009(DRS); 05000457/2006009(DRS)
w/Attachment: Supplemental Information

cc w/encl: Site Vice President - Braidwood Station
Plant Manager - Braidwood Station
Regulatory Assurance Manager - Braidwood Station
Chief Operating Officer
Senior Vice President - Nuclear Services
Vice President - Operations Support
Vice President - Licensing and Regulatory Affairs
Director Licensing
Manager Licensing - Braidwood and Byron
Senior Counsel, Nuclear, Mid-West Regional
Operating Group
Document Control Desk - Licensing
Assistant Attorney General
Illinois Emergency Management Agency
State Liaison Officer
Chairman, Illinois Commerce Commission

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Plant Manager - Braidwood Station
Regulatory Assurance Manager - Braidwood Station
Chief Operating Officer
Senior Vice President - Nuclear Services
Vice President - Operations Support
Vice President - Licensing and Regulatory Affairs
Director Licensing
Manager Licensing - Braidwood and Byron
Senior Counsel, Nuclear, Mid-West Regional
Operating Group
Document Control Desk - Licensing
Assistant Attorney General
Illinois Emergency Management Agency
State Liaison Officer
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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-456; 50-457
License No: NPF-72; NPF-77

Report No: 05000456/2006009(DRS); 05000457/2006009(DRS)

Licensee: Exelon Generation Company, LLC

Facility: Braidwood Station, Units 1 and 2

Location: Braceville, IL

Dates: June 12 through June 30, 2006

Inspectors: R. Langstaff, Senior Reactor Inspector, Lead
A. Dahbur, Reactor Inspector
A. Klett, Reactor Inspector

Observer: D. Lords, Reactor Engineer

Approved by: J. Lara, Chief
Engineering Branch 3
Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000456/2006009(DRS), 05000457/2006009(DRS); Exelon Generation Company, LLC; 06/12/2006 - 06/30/2006; Braidwood Station, Units 1 and 2; Triennial Fire Protection Baseline Inspection.

This report covers an announced triennial fire protection baseline inspection. The inspection was conducted by Region III inspectors. Three Green findings associated with Non-Cited Violations (NCVs) were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be "Green" or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. Inspector-Identified and Self-Revealed Findings

Cornerstone: Initiating Events

- Green. The inspectors identified a Non-Cited Violation (NCV) of the Braidwood Station Operating License having very low safety significance (Green) for the failure to implement the licensee's procedure for control of combustible materials. Specifically, licensee personnel staged unattended transient combustible materials near vertical cable tray risers in the auxiliary building in a manner contrary to the licensee's procedure for control of combustible materials. The primary cause of this finding was related to the Work Control attribute of the cross-cutting area of Human Performance because the licensee failed to appropriately plan work activities by incorporating job site conditions. This issue was entered into the station's corrective action program to relocate the stainless steel worktable and associated materials away from vertical cable tray risers, and to inspect other areas of the auxiliary building.

The finding was more than minor because the transient combustible materials presented a credible fire scenario involving equipment important to safety. The finding was of very low safety significance because the finding was assigned a low degradation rating due to the inability of the existing sources of heat or electrical energy to ignite the transient combustible materials. (Section 1R05.9)

Cornerstone: Mitigating Systems

- Green. The inspectors identified an NCV of the Braidwood Station Operating License having very low safety significance (Green) for the licensee's failure to include useful information in the station's pre-fire plans. Specifically, the licensee failed to include the presence of two compressed gas cylinders containing a mixture of hydrogen and nitrogen gases in the pre-fire plan for Fire Zone 11.5-0. This issue was entered into the licensee's corrective action program to evaluate the pre-fire plans.

The finding was more than minor because the failure to provide adequate warnings and guidance related to the hydrogen hazard in the pre-fire plan could have adversely impacted the fire brigade's ability to fight a fire. The finding was related to the performance of the fire brigade and was not suitable for SDP evaluation. Therefore, the finding was reviewed by NRC management and determined to be of very low safety significance due to the extensive training provided to fire brigade members to deal with unexpected contingencies. (Section 1R05.9)

Cornerstone: Barrier Integrity

- Green. The inspectors identified an NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," having very low safety significance (Green) for the licensee's failure to fully correct a previously identified condition. Specifically, although the licensee had previously identified an issue with respect providing assurance that appropriate compensatory measures were in place when opening main control room ventilation (VC) system duct access panels, the licensee failed to identify and correct all affected procedures. The inspectors determined that this issue also affected the corrective action attribute of the cross-cutting area of Problem Identification and Resolution because the licensee failed to ensure that conditions adverse to quality were adequately evaluated and corrected. This issue was entered into the licensee's corrective action program to revise the smoke detector testing procedure to reference the station's plant barrier impairment program.

This finding was more than minor because it could have become a more significant safety concern if the smoke detector testing procedure was not revised to include appropriate compensatory measures. Specifically, control room habitability could have been adversely affected if the ventilation duct access panel was not immediately closed during an event that could have resulted in smoke or toxic gas entry into the control room. This finding was determined to be of very low safety significance by an SDP Phase 3 evaluation. (Section 1R05.9)

B. Licensee-Identified Violations

No findings of significance were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events and Mitigating Systems

1R05 Fire Protection (71111.05)

The purpose of this inspection was to review the Braidwood Station Fire Protection Program (FPP) for selected risk-significant fire areas. Emphasis was placed on determining that the post-fire safe shutdown capability and the fire protection features were maintained free of fire damage to ensure that at least one post-fire safe shutdown success path was available. The inspection was performed in accordance with the NRC's regulatory oversight process using a risk-informed approach for selecting the fire areas and attributes to be inspected. The inspectors used the Braidwood Station Individual Plant Examination External Events and input from the RIII Senior Risk Analyst, to choose several risk-significant areas for detailed inspection and review. The fire zones, constituting three inspection samples, chosen for review during this inspection were:

<u>Fire Zones</u>	<u>Description</u>
2.1-0	Main Control Room
11.5-0	Auxiliary Building, 401 Foot Elevation
11.6-0	Auxiliary Building, 426 Foot Elevation

For each of these fire zones, the inspection focused on the fire protection features, the systems and equipment necessary to achieve and maintain safe shutdown conditions, determination of license commitments, and changes to the FPP.

.1 Systems Required to Achieve and Maintain Post-Fire Safe Shutdown

The guidelines established by Branch Technical Position (BTP), Chemical Engineering Branch (CMEB) 9.5-1, Section C.5.b, "Safe Shutdown Capability," Paragraph (1), required the licensee to provide fire protection features that were capable of limiting fire damage to structures, systems, and components (SSCs) important to safe shutdown. The SSCs that were necessary to achieve and maintain post-fire safe shutdown were required to be protected by fire protection features that were capable of limiting fire damage to the SSCs so that:

- one train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage; and
- systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours.

General Description of Safe Shutdown Paths and Capability

The licensee's safe shutdown methodology relied upon the identification of those components necessary and available to achieve and maintain hot shutdown conditions following a fire condition. Once identified for all plant areas, the licensee selected the components necessary to achieve and maintain the reactor in a hot shutdown condition which could be operated from the main control room or which could be operated locally and were not within the fire affected area. The methodology further identified those components necessary to achieve and maintain cold shutdown assuming limited repairs.

The licensee also identified an alternate shutdown capability for fire conditions that affected the main control room and other areas requiring alternative shutdown capability. For each of these areas, the licensee relied upon the operators' use of the alternate shutdown panel and local operator actions to ensure that the reactor could be brought to and maintained in a hot shutdown status.

a. Inspection Scope

The team reviewed the plant systems required to achieve and maintain post-fire safe shutdown to determine if the licensee had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions for each fire zone selected for review. Specifically, the review was performed to determine the adequacy of the systems selected for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring, and support system functions. This review included the fire protection safe shutdown analysis.

The team also reviewed the operators' ability to perform the necessary manual actions for achieving safe shutdown, including a review of procedures, accessibility of safe shutdown equipment, and the available time for performing the actions.

The team reviewed the Updated Final Safety Analysis Report (UFSAR) and the licensee's engineering and/or licensing justifications (e.g., U.S. Nuclear Regulatory Commission (NRC) guidance documents, license amendments, technical specifications, safety evaluation reports, exemptions, and deviations) to determine the licensing basis.

b. Findings

No findings of significance were identified.

.2 Fire Protection of Safe Shutdown Capability

The guidelines established by BTP CMEB 9.5-1, Section C.5.b, "Safe Shutdown Capability," Paragraphs (2)(a) and (3), required separation of cables and equipment and associated circuits of redundant trains by a fire barrier having a 3-hour rating. If the guidelines cannot be met, then alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room, or zone under consideration should be provided.

a. Inspection Scope

For each of the selected fire areas, the team reviewed the licensee's Safe Shutdown Analysis (SSA) to determine if at least one post-fire safe shutdown success path was available in the event of a fire. This included a review of manual actions required to achieve and maintain hot shutdown conditions and make the necessary repairs to reach cold shutdown within 72 hours. The team also reviewed procedures to determine whether or not adequate direction was provided to operators to perform these manual actions. Factors such as timing, access to the equipment, feasibility of the manual actions, and the availability of procedures, were considered in the review.

The team also evaluated the adequacy of fire suppression and detection systems, fire area barriers, penetration seals, and fire doors to determine if at least one train of safe shutdown equipment was free of fire damage. To accomplish this, the team observed the material condition and configuration of the installed fire detection and suppression systems, fire barriers, construction details, and supporting fire tests for the installed fire barriers. In addition, the team reviewed license documentation, such as deviations, detector placement drawings, fire hose station drawings, Fire Hazard Analysis (FHA) reports, SSA, and National Fire Protection Association codes to determine if the fire barrier installations met license commitments.

b. Findings

No findings of significance were identified.

.3 Post-Fire Safe Shutdown Circuit Analysis

The guidelines established by BTP CMEB 9.5-1, Section C.5.b, "Safe Shutdown Capability," Paragraph (1), required that SSCs important to safe shutdown be provided with fire protection features capable of limiting fire damage to ensure that one train of systems necessary to achieve and maintain hot shutdown conditions remained free of fire damage. Options for providing this level of fire protection were delineated in BTP CMEB 9.5-1, Section C.5.b, "Safe Shutdown Capability," Paragraph (2). Where the protection of systems whose function was required for hot shutdown did not satisfy BTP CMEB 9.5-1, Section C.5.b, Paragraph (2), an alternative or dedicated shutdown capability and its associated circuits, were required to be provided that was independent of the cables, systems, and components in the area. For such areas, BTP CMEB 9.5-1, Section C.5.c, "Alternative or Dedicated Shutdown Capability," Paragraph (3), specifically required the alternative or dedicated shutdown capability to be physically and electrically independent of the specific fire areas and capable of accommodating post-fire conditions where offsite power was available and where offsite power was not available for 72 hours.

a. Inspection Scope

On a sample basis, the team examined the adequacy of separation provided for the power, control and instrumentation cabling of balance-of-plant and redundant trains of selected components in systems important for post-fire safe shutdown. The team also reviewed selected components whose inadvertent operation due to a fire may adversely

affect post-fire safe shutdown capability. The purpose of this review was to determine if a single exposure fire in one of the fire areas selected for this inspection could prevent the proper operation of both safe shutdown trains.

The team evaluated selected portions of licensee's breaker coordination analysis for ground faults on the 480 Volts alternating current (Vac) systems and the vital-low-voltage alternating current and direct current power sources to determine whether fire-induced faults on distribution system cables or buses could degrade post-fire safe shutdown capability. Specifically, the team determined if selective coordination existed between branch circuit protective devices and the upstream distribution panel breaker feeders to ensure that in the event of a fire-induced short circuit in a dedicated area (i.e., control room, relay room, etc.), the fault would be isolated to the dedicated area and away from the alternative shutdown panel before the upstream feeder breaker tripped.

b. Findings

No findings of significance were identified.

.4 Alternative Safe Shutdown Capability

The guidelines established by BTP CMEB 9.5-1, Section C.5.b, "Safe Shutdown Capability," Paragraph (1), required the licensee to provide fire protection features that were capable of limiting fire damage so that one train of systems necessary to achieve and maintain hot shutdown conditions remained free of fire damage. Specific design features for ensuring this capability were provided in BTP CMEB 9.5-1, Section C.5.b, Paragraph (2). Where compliance with the separation criteria of BTP CMEB 9.5-1, Section C.5.b, Paragraphs (1) and (2) could not be met, BTP CMEB 9.5-1, Section C.5.b, Paragraph (3) and Section C.5.c, required an alternative or dedicated shutdown capability be provided that was independent of the specific fire area under consideration. Additionally, alternative or dedicated shutdown capability must be able to achieve and maintain hot standby conditions and achieve cold shutdown conditions within 72 hours and maintain cold shutdown conditions thereafter. During the post-fire safe shutdown, the reactor coolant process variables must remain within those predicted for a loss of normal alternating current power, and the fission product boundary integrity must not be affected (i.e., no fuel clad damage, rupture of any primary coolant boundary, or rupture of the containment boundary).

a. Inspection Scope

The team reviewed the licensee's systems required to achieve alternative safe shutdown to determine if the licensee had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions. The team also focused on the adequacy of the systems to perform reactor pressure control, reactivity control, reactor coolant makeup, decay heat removal, process monitoring, and support system functions.

b. Findings

No findings of significance were identified.

.5 Operational Implementation of Alternative Shutdown Capability

The guidelines established by BTP CMEB 9.5-1, Section C.5.c, "Alternative or Dedicated Shutdown Capability," Paragraph (2)(d), required that the process monitoring function should be capable of providing direct readings of the process variables necessary to perform and control the functions necessary to achieve reactivity control, reactor coolant makeup, and decay heat removal.

a. Inspection Scope

The team performed a walkdown of a sample of the actions defined in Procedure BwOP FP-100T3, Attachment 3, "11.5-0, 401' Auxiliary Building General Area, 1D-8, 1S57, 2S-54." The team conducted the walkdown to determine if operators could reasonably be expected to perform the procedure actions and that equipment labeling was consistent with the procedure. The review also looked at operator training as well as consistency between the operations shutdown procedures and any associated administrative controls. The team's review of the adequacy of emergency lighting associated with these procedures are documented in Section 1R05.6 of this report.

b. Findings

No findings of significance were identified.

.6 Emergency Lighting

The guidelines established by BTP CMEB 9.5-1, Section C.5.g, "Lighting and Communication," Paragraph (1), required that fixed self-contained lighting consisting of fluorescent or sealed-beam units with individual eight-hour minimum battery power supplies should be provided in areas that must be manned for safe shutdown and for access and egress routes to and from all fire areas.

a. Inspection Scope

The team performed a walkdown of a sample of the actions defined in procedure BwOP FP-100T3, Attachment 3, used to control local equipment operations. As part of the walkdowns, the team determined if sufficient emergency lighting existed for access and egress to areas and for performing necessary equipment operations. The team also determined if testing of emergency lighting ensured a minimum of eight hours of emergency lighting.

b. Findings

No findings of significance were identified.

.7 Cold Shutdown Repairs

The guidelines established by BTP CMEB 9.5-1, Section C.5.c, "Alternative or Dedicated Shutdown Capability," Paragraph (5), required that equipment and systems comprising the means to achieve and maintain cold shutdown conditions should not be damaged by fire; or the fire damage to such equipment and systems should be limited so that the systems can be made operable and cold shutdown achieved within 72 hours. Materials for such repairs shall be readily available onsite and procedures shall be in effect to implement such repairs.

a. Inspection Scope

The team reviewed the licensee's procedures to determine if any repairs were required to achieve cold shutdown.

b. Findings

No findings of significance were identified.

.8 Fire Barriers and Fire Zone/Room Penetration Seals

The guidelines established by BTP CMEB 9.5-1, Section C.5.a, "Building Design," Paragraph (3), required that penetration seal designs be qualified by tests that are comparable to tests used to rate fire barriers.

a. Inspection Scope

The team reviewed test reports for three-hour rated barriers installed in the plant, performed visual inspections of selected barriers to determine if the barrier installations were consistent with tested configuration, and reviewed drawings and penetration seal schedules.

b. Findings

No findings of significance were identified.

.9 Fire Protection Systems, Features, and Equipment

The guidelines established by BTP CMEB 9.5-1 required that fire protection systems, features and equipment were designed in accordance with the following:

<u>Fire Protection Systems, Features and Equipment</u>	<u>BTP CMEB 9.5-1 Section</u>	<u>BTP CMEB 9.5-1 Title</u>
Fire Brigade Capabilities	C.3	Fire Brigade

Passive Fire Protection Features	C.5.a	Building Design
Fire Detection System	C.6.a	Fire Detection
Fire Suppression System	C.6.b	Fire Protection Water Supply Systems
	C.6.c	Water Sprinkler and Hose Standpipe Systems
Manual Fire Fighting Equipment	C.6.f and C.3	Portable Extinguishers and Fire Brigade

a. Inspection Scope

The team reviewed the material condition, operations lineup, operational effectiveness, and design of fire detection systems, fire suppression systems, manual fire fighting equipment, fire brigade capability, and passive fire protection features. The team reviewed deviations, detector placement drawings, fire hose station drawings, and FHA reports to determine if selected fire detection systems, sprinkler systems, portable fire extinguishers, and hose stations were installed in accordance with their design, and that their design was adequate given the current equipment layout and plant configuration.

b. Findings

b.1 Failure to Adequately Control Transient Combustibles

Introduction: The inspectors identified a non-cited violation (NCV) of the Braidwood Station Operating License having very low safety significance (Green) for the failure to implement the licensee’s procedure for control of combustible materials. Specifically, licensee personnel staged unattended transient combustible materials near vertical cable tray risers in the auxiliary building contrary to the licensee’s procedure for control of combustible materials.

Description: The inspectors identified unattended transient combustibles placed on a stainless steel table set next to vertical cable risers in the Unit 2 auxiliary building. The transient combustibles included a plastic trash bag containing six nylon fall protection harnesses and three polypropylene plastic bins (approximately 8 inches by 15 inches by 7 inches) containing minor radiation protection supplies (including eight pairs of cotton gloves and six pairs of nitrile gloves). The inspectors noted that some of the materials, such as the plastic bag containing fall protection harnesses, were located approximately eight inches from vertical cable risers, which was within the zone of influence for a 70 kiloWatt (kW) fire for thermoset cables (Table 2.3.2, “Calculated Values (in feet) for Use in the Ball and Column Zone of Influence Chart for Fires in an Open Location Away from Walls,” IMC 0609, Appendix F, “Fire Protection Significance Determination Process,” dated February 28, 2005). The inspectors also noted that there was a sign attached to

one of the vertical cable risers which stated, "No combustible materials allowed. Please store in combustible storage cabinets." Some of the vertical cable risers were safety-related cable risers.

Section 4.4.2, paragraph 6, of procedure OP-AA-201-009, Control of Transient Combustible Material, stated "Do not stage exposed Class A combustible material directly beneath horizontal cable trays, and immediately adjacent to (i.e., approximately three (3) feet) vertical cable tray risers, live electrical components (i.e., transformers, switchgear, motor control centers, etc.) and instrument racks." Procedure OP-AA-201-009 defined Class A materials as ordinary combustibles materials, such as wood, cloth, paper, rubber, charcoal, and plastics. The materials identified on the stainless steel tables were Class A combustible materials. The inspectors considered the placement of unattended combustible materials on the stainless steel table to be contrary to the requirements of procedure OP-AA-201-009.

Once identified, the licensee initiated Issue Report (IR) 00502538, "Improper Placement of Combustibles Near Vertical Cable Riser," relocated the stainless steel worktable and associated materials away from vertical cable tray risers, and inspected other areas. As part of their review, the licensee identified a similar condition elsewhere in the auxiliary building in that another stainless steel table was located near vertical cable tray risers with five polypropylene bins.

Analysis: The inspectors determined that staging transient combustible materials near vertical cable tray risers was a performance deficiency, warranting a significance evaluation. Specifically, the procedure for implementing transient combustible controls required that Class A transient combustibles not be staged unattended near vertical cable tray risers. The inspectors concluded that the finding was greater than minor in accordance with Inspector Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," issued on September 30, 2005, because the failure to adequately control combustible materials was associated with an increase in the likelihood of an initiating event, i.e., fire. Specifically, the transient combustibles were located within the zone of influence for a 70 kW fire for thermoset cables (IMC 0609, Appendix F, Table 2.3.2) located within the vertical cable tray risers. Consequently, the transient combustibles presented a credible fire scenario involving equipment important to safety (such as the safety related cables within the vertical cable tray risers). In addition, the finding affected the Work Control attribute of the cross-cutting area of Human Performance because the licensee failed to appropriately plan work activities by incorporating job site conditions. In this instance, the stainless steel tables were used for work activities by radiation protection personnel which resulted in unattended staging of transient combustible materials on the tables. The placement of the stainless steel tables near the vertical cable tray risers failed to consider job site conditions in the that the placement of unattended transient combustible materials on the tables presented a credible fire scenario involving equipment important to safety and was contrary to site procedures.

The inspectors reviewed IMC 0609, "Significance Determination Process," Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," dated November 22, 2005, and determined that since the finding affected administrative controls for fire protection, a significance determination evaluation under IMC 0609,

Appendix F, was required. The inspectors completed a significance determination of this issue using IMC 0609, Appendix F, Attachment 2, "Degradation Rating Guidance Specific to Various Fire Protection Program Elements." The inspectors determined that the staging of Class A combustibles was a low degradation finding against the combustible controls program because the identified materials would not cause a fire from existing sources of heat or electrical energy. Question 1 of IMC 0609, Appendix F, Task 1.3.1, "Qualitative Screening for All Finding Categories," showed that the finding was of very low safety significance (Green) due to the low degradation rating.

Enforcement: License condition 2.E of the Unit 2 Braidwood Station Operating License NPF-77 required, in part, that the licensee implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report, as supplemented and amended, and as approved in the Safety Evaluation Report dated November 1983 and its supplements. Section 9.5.1, "Fire Protection Systems," of the UFSAR, stated that the design bases, system descriptions, safety evaluation, inspection and testing requirements, personnel qualification, and training were described in the Byron/Braidwood Fire Protection Report. Section 3.2, paragraph c., of the Byron/Braidwood Fire Protection Report stated that the station complied with the NRC guideline that administrative controls should be used to maintain the performance of the fire protection system and personnel. The controls established procedures to govern the handling of and limit transient fire loads such as combustible and flammable liquids, wood and plastic products, or other combustible materials in buildings containing safety related systems or equipment during all phases of operating, and especially during maintenance, modification, or refueling operations. Procedure OP-AA-201-009 provided the administrative controls to satisfy the commitment outlined in Section 3.2, paragraph c., of Byron/Braidwood Fire Protection Report. Section 4.4.2, paragraph 6, of procedure OP-AA-201-009, "Control of Transient Combustible Material," specified that Class A combustible materials not be staged immediately adjacent to (i.e., approximately three (3) feet) vertical cable tray risers.

Contrary to the above, on June 15, 2006, the inspectors identified Class A unattended combustible materials staged immediately adjacent to vertical cable tray risers on the 364 foot elevation of the general area (Unit 2 side) of the auxiliary building, a building containing safety related systems and equipment. Specifically, a plastic trash bag containing six nylon fall protection harnesses and three polypropylene plastic bins (approximately 8 inches by 15 inches by 7 inches) containing minor radiation protection supplies (including eight pairs of cotton gloves and six pairs of nitrile gloves) were set within three feet of the vertical cable tray risers. Once identified, the licensee entered the issue into the corrective action program under IR 00502538, relocated the stainless steel worktable and associated materials away from vertical cable tray risers, and inspected other areas of the auxiliary building. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. (NCV 05000456/2006009-01(DRS); 05000457/2006009-01(DRS))

b.2 Inadequate Pre-Fire Plan

Introduction: The inspectors identified an NCV of the Braidwood Station Operating License having very low safety significance (Green) for the licensee's failure to include

useful information in the station's pre-fire plans. Specifically, the licensee failed to include in the pre-fire plan the presence of two compressed gas cylinders located in Fire Area 11.5-0.

Description: During a walkdown through Fire Area 11.5-0, the inspectors noted two compressed gas cylinders containing a mixture of hydrogen (22 percent) and nitrogen (78 percent) gases. The cylinders, which were used for calibration purposes, were marked as "Flammable" material and were permanently installed near the hydrogen recombiner. The inspectors reviewed the associated pre-fire plan for the fire area and noted that it did not list hydrogen gas as a hazard. The inspectors reviewed the Braidwood Station Fire Protection Report Section 2.3.11.41, which indicated that there were 22 compressed gas cylinders containing a 2,000 ppm to 22 percent hydrogen concentration with nitrogen mixture for calibrating the hydrogen recombiners.

Appendix A.5, Section K.12, "10 CFR Part 50 Appendix R Byron/Braidwood Conformance," of Braidwood's FPP, indicated that the licensee complied with the NRC position which required the licensee to define the strategies for fighting fires in all safety-related areas and in areas presenting a hazard to safety-related equipment. These strategies were required to designate the fire hazards in each area covered by the specific pre-fire plans. The licensee's response indicated that they complied, and the pre-fire plans identified major in-situ combustibles for the areas they covered. In addition, in procedure OP-AA-210-008, "Pre-Fire Plan," Paragraph 1.2, "Purpose," the licensee stated, "The plans are designed to provide as much useful information as possible in a short amount of time ... [and] they provide useful information for quickly determining emergency response strategies based on hazards and equipment in the area." The inspectors determined that the two cylinders containing flammable hydrogen gas presented a hazard and should have been included in the pre-fire plan for the area. The licensee entered this issue into the station's corrective action program as IR 00500529, "Span Gas Cylinders not Described in Pre-Fire Plans." Discussions with licensee engineering staff indicated that they planned to revise the pre-fire plan to include the flammable gas cylinders.

Analysis: The inspectors determined that the failure to include the presence of compressed hydrogen gas cylinders in the pre-fire plan was a performance deficiency warranting a significance evaluation. The inspectors concluded that the finding was greater than minor in accordance with IMC 0612, Appendix B. The finding involved the attribute of protection against external factors (i.e., fire) because the failure to provide in the pre-fire plan adequate warnings and guidance related to the hydrogen hazard could have adversely impacted the fire brigade's ability to fight a fire. As such, this finding affected the mitigating systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).

In accordance with IMC 0609, Appendix A, the inspectors performed an SDP Phase 1 screening and determined that the finding affected fire protection defense-in-depth strategies. However, as discussed by IMC 0609, Appendix A, Attachment 1, issues related to performance of the fire brigade are not included in IMC 0609, Appendix F, and require management review. Therefore, the finding was reviewed by NRC management, and was determined to be a finding of very low safety significance

(Green) due to the extensive training provided to fire brigade members to deal with unexpected contingencies.

Enforcement: License condition 2.E of the Unit 1 Braidwood Station Operating License NPF-72 required, in part, that the licensee shall implement and maintain in effect all provisions of the approved fire protection program as described in Final Safety Analysis Report, as supplemented and amended, and as approved in the safety evaluation report dated November 1983, and its supplements. Section 9.5.1, "Fire Protection Systems," of the UFSAR, stated that the design bases, system descriptions, safety evaluation, inspection and testing requirements, personnel qualification, and training were described in the Byron/Braidwood Fire Protection Report. Section K.12 of Appendix A.5, "10 CFR Part 50 Appendix R Byron/Braidwood Conformance," to Byron/Braidwood's Fire Protection Program, stated the NRC requirement for the licensee to define the strategies for fighting fires in all safety-related areas, and areas presenting a hazard to safety-related equipment. These strategies were required to designate the fire hazards in each area covered by the specific pre-fire plans. The licensee indicated that they complied, and the pre-fire plans identified major in-situ combustibles for the areas they covered. In addition, procedure OP-AA-210-008, "Pre-Fire Plan," Paragraph 1.2 stated, "The plans are designed to provide as much useful information as possible in a short amount of time ... [and] they provide useful information for quickly determining emergency response strategies based on hazards and equipment in the area."

Contrary to the above, as of June 13, 2006, the licensee's pre-fire plan for Fire Area 11.5-0 did not identify fire hazards and major in-situ combustibles which existed for the area. Specifically, the pre-fire plan did not identify two gas cylinders containing flammable concentrations of hydrogen located in this fire area. The two gas cylinders containing flammable concentrations of hydrogen were a fire hazard and a major in-situ combustible. Once identified, the licensee entered the finding into their corrective action program as IR 00500529, "Span Gas Cylinders Not Described in Pre-Fire Plans." Because this violation was of very low safety significance, and it was entered into the licensee's corrective action program, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. (NCV 05000456/2006009-02(DRS); 05000457/2006009-02(DRS))

b.3 Failure to Take Effective Corrective Action

Introduction: The inspectors identified an NCV of 10 CFR Part 50, Appendix B, Criterion-XVI, "Corrective Action," having very low safety significance (Green) for the licensee's failure to fully correct a previously identified condition. Specifically, although the licensee had previously identified an issue with respect providing assurance that appropriate compensatory measures were in place when opening main control room ventilation (VC) system duct access panels, the licensee failed to identify and correct all affected procedures.

Description: Section 4.9 of procedure MA-BR-723-002, "Smoke Detector Testing," provided guidance for the inspection and cleaning of type CA-4/DA-4 smoke detector sample tubes, which was applicable to the detectors installed in the VC system. Step 4.9.1 of procedure MA-BR-723-002 directed the removal of the air duct covers as necessary to gain access to detector sample tubes for inspection and cleaning. The

procedure did not provide instructions to evaluate the opening of the VC system duct access panels per the plant barrier impairment (PBI) program. The procedure also did not specify compensatory measures for when the duct access panels were removed and resulted in breaching the VC system boundary. The VC system boundary provided protection against events that could result in smoke-filled or toxic atmospheres. The inspectors questioned the lack of compensatory measures and whether there was an evaluation associated with this issue.

The inspectors reviewed the licensee's plant barrier control program described in procedure CC-AA-201, "Plant Barrier Control Program," and its supplement, procedure BwAP 1110-3, "Plant Barrier Impairment Program." The licensee's plant barrier control program required evaluation of all PBIs to ensure that barrier design functions were maintained.

The inspectors noted that a condition adverse to quality regarding impact associated with the removal of the VC duct access panels on the operability of the control room ventilation system was previously identified in August of 2004. During the performance of BwMP 3300-052, "18 Month Visual Inspection of all Safety Related Fire Dampers," in August 2004, the licensee's operations staff initiated IR 00247433, "BwMP-3300-052 and Operability of VC," to evaluate the impacts associated with the removal of the VC system duct access panels. The evaluation concluded that although Technical Specification Bases B3.7.10 stated that the control room boundary must be maintained (including the integrity of the walls, floors, ceiling, ductwork and access doors), the removal of VC system duct access covers for duct inspection was acceptable without entering the associated Technical Specification limiting condition of operation (LCO) as long as appropriate compensatory measures or administrative controls were in place. These controls would require actions by a dedicated individual to ensure the access covers would be installed when required during specific events. The licensee revised procedure BwMP 3300-052 to include a steps to ensure that a PBI form was completed and that the required compensatory measures were established. However, the licensee failed to identify and revise procedure MA-BR-723-002 during their review of the condition adverse to quality identified in IR 00247433.

In addition, Technical Specification Bases B.3.7.10, Action Statement E.1, indicated that if both VC filtration system trains were inoperable in Modes 1, 2, 3 or 4, the VC filtration system may not be capable of performing the intended function and the unit was in a condition outside the accident analysis, and therefore, Technical Specification Limiting Condition for Operation (LCO) 3.0.3 must be entered immediately. Based on the above discussion, the inspectors determined that the work included in the smoke detector testing, and fire damper inspection procedures (procedures MA-BR-723-002, and BwMP-3300-052, respectively) which required the opening of access panels on the common VC ducts had rendered both trains inoperable in the past when performed. As such, entry into Technical Specification LCO 3.0.3 was required.

While reviewing the historical performance of procedure MA-BR-723-002, the licensee identified that the PBI documentation for 15 of 37 work orders associated with this procedure was missing. There were no documents found to show that compensatory measures had been established when the VC duct access panels were removed for duct sample tube inspection associated with these 15 work orders. The licensee

reviewed the control room log, and the alarm event recorder records, and verified that each control room duct access cover was not removed for longer than ten minutes and, therefore, no Technical Specification LCO time periods had been exceeded.

The licensee entered this issue into the station's corrective action program as IR 00502715, "Revise MA-BR-723-002 to Reference the Station PBI Program;" IR 00503914, "Missing PBI Documentation for 15 VC Work Orders;" and IR 00504181 "IR 247433 Extent of Condition Failed to Identify Procedure."

Analysis: The inspectors determined that the failure to revise procedure MA-BR-723-002 to include the requirements of the PBI program and provide appropriate compensatory measures when opening the control room ventilation duct access panel was a performance deficiency warranting a significance evaluation. The inspectors concluded that the finding was greater than minor in accordance with IMC 0612, Appendix B. The inspectors determined that the finding, if left uncorrected, could have become a more significant safety concern. Specifically, while performing procedure MA-BR-723-002, control room habitability could have been adversely impacted if control room ventilation duct access panels were not immediately closed by an individual dedicated to maintain the control room boundary during certain events. The inspectors determined that this issue also affected the Corrective Action Program attribute of the cross-cutting area of Problem Identification and Resolution because the licensee failed to ensure that conditions adverse to quality were adequately evaluated and corrected. Specifically, the licensee failed to identify the need to revise procedure MA-BR-723-002 during the review of similar procedure condition previously identified in August of 2004.

In accordance with IMC 0609, Appendix A, the inspectors performed an SDP Phase 1 screening and determined that the finding affected the Containment Barriers Cornerstone because the finding affected the configuration control attribute and represented a degradation of the barrier function of the control room against smoke-filled or toxic atmospheres. This finding screened to a Phase 3 analysis in accordance with the SDP Phase 1 worksheet. A regional Senior Reactor Analysts reviewed the finding and assumed that all 15 completed work order surveillance activities did not utilize compensatory measures and were completed in the same year. Based on this assumption, there would have been less than 2.5 hours out of an entire year where the control room barrier may have been susceptible to a smoke or toxic gas event and, as such, would represent an extremely small exposure period. This small exposure period combined with the low initiating event frequency of a smoke or toxic gas event resulted in the determination that the finding was much less than the 1×10^{-6} per year core damage frequency threshold and was of very low safety significance (Green).

Enforcement: Criterion XVI of 10 CFR Part 50, Appendix B, requires, in part, that conditions adverse to quality, shall be identified and corrected. Braidwood's Technical Specification Bases B.3.7.10 stated that the control room boundary must be maintained including the integrity of the walls, floors, ceilings, ductwork and access doors. Section 1.1 of procedure CC-AA-201 provided guidance and clarification for the actions necessary to evaluate and compensate for impaired fire, ventilation, and missile barriers. Section 1.3 of procedure CC-AA-201 further stated that the procedure applied to plant barriers, such as doors, walls, heating, ventilation, and air conditioning plenum and ductwork.

Contrary to the above, in August of 2004, the licensee failed to identify and correct a condition adverse to quality. Specifically, as described in IR 00247433, initiated in August of 2004, the licensee identified that the licensee did not have adequate evaluation and appropriate compensatory measures when the VC duct access panels were removed during testing. The licensee failed to correct this issue in that, as of June 16, 2006, procedure MA-BR-723-002 did not provide instructions to evaluate the opening of the VC duct access panels per the plant barrier impairments program nor provide appropriate compensatory measures. In addition, there were no documents to show that the licensee established appropriate compensatory measures for 15 work orders performed per procedure MA-BR-723-002 which required the removal or opening of the VC duct access panels. Once identified, the licensee entered the finding into their corrective action program as IRs 00502715, 00503914, and 00504181. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. (NCV 05000456/2006009-03(DRS); 05000457/2006009-03(DRS))

.10 Compensatory Measures

a. Inspection Scope

The team conducted a review to determine if adequate compensatory measures were put in place by the licensee for out-of-service, degraded, or inoperable fire protection and post-fire safe shutdown equipment, systems, or features. The team also reviewed the adequacy of short term compensatory measures to compensate for a degraded function or feature until appropriate corrective actions were taken.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA2 Identification and Resolution of Problems (71152)

The guidelines established by BTP CMEB 9.5-1, Section C.4, "Quality Assurance Program," Paragraph h, required that measures be established to ensure that conditions adverse to fire protection, such as failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustible material and nonconformance, are promptly identified, reported, and corrected.

a. Inspection Scope

The team reviewed a selected sample of condition reports associated with the licensee's FPP to determine if the licensee had an appropriate threshold for identifying issues. The team evaluated the effectiveness of the corrective actions for the identified issues. During the inspection, the team verified that licensee personnel were

documenting fire protection problems in the corrective action program in accordance with 10 CFR Part 50, Appendix B, Criterion XVI, and licensee corrective action program procedures. The team determined if the apparent cause evaluation and corrective actions were appropriate, timely, and commensurate with the safety significance of the problem. In addition, the team reviewed a sample of the FPP self-assessments which the licensee performed in the previous two-year period. The team evaluated the effectiveness of the corrective actions for the identified issues.

b. Findings

No findings of significance were identified.

4OA5 Other Activities

(Closed) Unresolved Item (URI) 05000456/2005012-01; 05000457/2005012-01: Molded Case Circuit Breaker Testing Results.

A URI was opened during the 2005 Problem Identification and Resolution Inspection regarding the licensee's corrective actions for a previously issued NCV. Specifically, the inspectors questioned the adequacy of the licensee's corrective actions for the high out-of-tolerance (OOT) results during 480 Volt alternating current (Vac) Westinghouse HFB magnetic-only Molded Case Circuit Breaker (MCCB) testing coupled with the MCCBs that had not been tested since the plant's construction. This issue was unresolved because the inspectors needed additional information to determine:

- the potential OOT high conditions would not adversely impact the worst-case coordination studies;
- the acceptability of not increasing the cycling and testing of these breakers as recommended by the vendor; and
- the generic manufacturing implications of the failure mechanism.

During this inspection, the inspectors reviewed the licensee's response to these concerns. To address the first concern that the potential OOT high conditions would not adversely impact the worst-case coordination studies, the licensee showed that assuming the worst-case OOT high test result for all 480 Vac HFB magnetic-only MCCBs, the breakers would have remained coordinated with upstream breakers using the coordination studies performed in the calculation 19-AU-4, "480V Unit substation Breaker and Relay Settings." The worst-case tested trip current (~20 percent OOT high) for these breakers would have been 320 amperes, which was below the motor control center feed (upstream) breakers setting of 3200 amperes. The MCCBs that tested OOT high were replaced or scheduled to be replaced, and new breakers were tested prior to installation. The licensee generated IRs for breakers found OOT, and the condition was evaluated to determine if the MCCB was capable of performing its design function.

The inspectors reviewed the licensee's response regarding the acceptability of not increasing the cycling and testing of the MCCBs, as recommended by the vendor, to ensure that lubrication was well distributed on moving parts. The licensee believed that

the additional tests and inspections performed on the breakers indicated that the OOT high conditions were caused by twisting and warping of the trip bar (from original manufacturing) and not by lubrication problems. The licensee's current procedures used for testing were based on National Electrical Manufacturers Association standard AB-4 recommendations, and the testing frequencies were developed from NMAC and owners group recommendations. The licensee felt that the vendor's recommendations were inconsistent with industry norms; therefore, the licensee maintained a testing frequency of 6 years for safety-related breakers.

The inspectors also reviewed the licensee's response regarding the generic manufacturing implications of the failure mechanism. The licensee completed an engineering change evaluation to determine if 10 CFR Part 21 was applicable to the issue of the HFB MCCBs tripping OOT high during testing. The licensee concluded that the OOT high condition did not affect the ability of the MCCBs to perform their design function to isolate faults and remain coordinated with the upstream breakers. The licensee concluded that the condition did not result in a substantial safety hazard, and therefore, 10 CFR Part 21 was not applicable.

The inspectors did not identify any concerns with the licensee's response to the issue. Therefore, no performance deficiency or violation was identified, and this URI is closed.

4OA6 Meetings

.1 Exit Meeting

The team presented the inspection results to Mr. K. Polson and other members of licensee management at the conclusion of the inspection on June 30, 2006. The team asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

K. Polson, Site Vice-President
D. Ambler, Manager, Regulatory Affairs
G. Dudek, Director, Operations
C. Dunn, Director, Training
C. Furlow, Design Engineering
D. Galentine, Fire Marshal
E. O'Donnell, Design Engineering
K. Radke, System Engineering
P. Rausch, Operations
D. Riedinger, Design Engineering
M. Smith, Director, Engineering
R. Wolen, Design Engineering

Nuclear Regulatory Commission

A. Boland, Deputy Director, Division of Reactor Safety, Region III
S. Ray, Senior Resident Inspector, Braidwood, Division of Reactor Projects, Region III
R. Skokowski, Chief, Branch 3, Division of Reactor Projects, Region III

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000456/2006009-01 05000457/2006009-01	NCV	Failure to Adequately Control Transient Combustibles (Section 1R05.9)
05000456/2006009-02 05000457/2006009-02	NCV	Inadequate Pre-Fire Plan (Section 1R05.9)
05000456/2006009-03 05000457/2006009-03	NCV	Failure to Take Effective Corrective Action (Section 1R05.9)

Closed

05000456/2006009-01 05000457/2006009-01	NCV	Failure to Adequately Control Transient Combustibles (Section 1R05.9)
05000456/2006009-02 05000457/2006009-02	NCV	Inadequate Pre-Fire Plan (Section 1R05.9)
05000456/2006009-03 05000457/2006009-03	NCV	Failure to Take Effective Corrective Action (Section 1R05.9)
05000456/2005012-01; 05000457/2005012-01	URI	Molded Case Circuit Breaker Testing Results (Section 4AO5)

Discussed

None.

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety but rather that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

Calculations

19-AU-4; 480V Unit Substation Breaker and Relay Settings; Revision 18

BRW-98-1287-E; Coordination Calculation for 125Vdc and 120Vac Post Fire Safe Shutdown Circuits; Revision 1

Issue Reports

00167126; Classification of Heat Detectors in Upper Cable Spreading Rm; dated July 10, 2003

00235704; NRC ID'D Need For Improvements to Safe Shutdown Procedure; dated July 13, 2004

00247433; BwMP-3300-052 and Operability of VC; dated August 26, 2004

00475818; Fire Protection Report Error Regarding LSH; dated April 6, 2006

00478942; DC Molded Case Circuit Breaker Cycling Not Performed (U1andU2); dated April 14, 2006

00482093; Inspect and Clean All Cable Pans in LCSR; dated April 22, 2006

00487065; 2006 FP FASA - Deficiencies Identified With Pre-Fire Plans; dated May 5, 2006

00498522; Formalize Fire Protection Report Support Documentation; dated June 9, 2006

Problem Identification Form A2000-02533; Inconsistency Between Our Breaker Testing and the Fire Protection Report; dated June 13, 2000

Issue Reports Initiated as a Result of Inspection

00499612; Safe Shutdown Analysis Discrepancy; dated June 13, 2006

00499614; Emergency Battery Pack Lighting Drawing Discrepancies; dated June 13, 2006

00500529; Span Gas Cylinders Not Described in Pre-Fire Plans; dated June 15, 2006

00500754; Spurious Closure of VCT Outlet Isolation Valves; dated June 16, 2006

00500815; Change to Detector Design Lacks Supervision of Power; dated June 16, 2006

00501666; Fire Brigade Mobile Equipment Quantities Do Not BTP; dated June 20, 2006
00502528; Improper Placement of Combustibles Near Vertical Cable Riser; dated June 22, 2006
00502581; FPR Code Review for NFPA 80-1983 Requires Revision; dated June 22, 2006
00502715; Revise MA-BR-723-002 to Reference the Station PBI Program; dated June 22, 2006
00503012; 1/2 BwOA PRI-5 Enhancement; dated June 23, 2006
00503914; Missing PBI Documentation for 15 VC Work Orders; dated June 27, 2006
00504181; IR# 247433 Extent of Condition Failed to Identify Procedure; dated June 27, 2006
00504364; Create Labels for Breaker Reach Rods; dated June 28, 2006
00504536; BwOP FP-100 Series Procedure Enhancement; dated June 28, 2006
00504837; BwOP FP-100 Fire Response Guidelines Enhancement; dated June 29, 2006
00505150; Evaluate Additional Vent Paths for Non-Vented MCR Panels; dated June 29, 2006
00505311; Appendix R Emergency Lighting for Local Instrumentation; dated June 30, 2006
00505489; NRC Question Licensing Basis for MCR Panel Fire Detection; dated June 30, 2006

Drawings

20E-0-3371D; Electrical Installation Aux. Bldg. Plan El. 451'-0" Col. M-Q, 11-13; Revision DM
20E-0-3372; Electrical Installation Auxiliary Building Main Control Room Upper Plan EL. 451'-0"
Col. 12-23, L-P; Revision CV
20E-0-3655; Cable Pans Routing Auxiliary Bldg. Plan El. 364'-0" Cols. L-Q, 10-18; Revision AG
20E-0-3657; Cable Pans Routing Auxiliary Bldg. Plan El. 364'-0" Cols. Q-Z, 10-18; Revision AC
20E-0-3659; Cable Pans Routing Auxiliary Bldg. Plan El. 383'-0" Cols. L-Q, 10-18; Revision AJ
20E-0-3661; Cable Pans Routing Auxiliary Bldg. Plan El. 383'-0" Cols. Q-Y, 10-18; Revision G
20E-0-3663; Cable Pans Routing Auxiliary Bldg. Plan El. 401'-0" Cols. L-Q, 7-18; Revision AV
20E-0-3665; Cable Pans Routing Auxiliary Bldg. Plan El. 414'-0" Cols. Q-Y, 7-18; Revision AN
20E-0-3667; Cable Pans Routing Auxiliary Bldg. Plan El. 426'-0" Cols. L-Q, 6-18; Revision BE
20E-0-3669; Cable Pans Routing Auxiliary Bldg. Plan El. 426'-0" Cols. Q-Y, 7-18; Revision AK

20E-0-3672; Cable Pans Routing Auxiliary Bldg Plan El. 439'-0" Cols. L-Q and 10-13; Revision AL

20E-0-3673; Cable Pans Routing Auxiliary Bldg. Plan El. 439'-0" Cols. L-Q, 13-18; Revision AK

20E-0-3687C; Cable Pans Routing Aux Bldg. Plan El. 463'-5" Cols. L-Q, 10-18; Revision AK

20E-0-3815; Fire Detection Lake Screen House; Revision F

20E-1-4030CV01; Schematic Diagram Centrifugal Charging Pump 1A - 1CV01PA; Revision N

20E-1-4030CV01; Schematic Diagram Centrifugal Charging Pump 1B - 1CV01PB; Revision R

20E-1-4030CV10; Schematic Diagram Volume Control Tank Outlet Isolation Valves 1CV112B and 1CV112C; Revision N

20E-1-4030CV11; Schematic Diagram Charging Pumps From Refueling Water Storage Tank Suction Valves 1CV112D and 1CV112E; Revision P

BR-E-09; Transco Products INC, CT Gypsum for Fire/Air Seals at Cable Tray/Cable Opening in Floors; dated February 22, 1985

Byron/Braidwood Station Fire Protection Report, Figure 2.3-12; Grade Floor Elevation 401'-0", Sheet 1 and 3

M-61 Sheet 1A; Diagram of Safety Injection Unit 1; Revision BF

M-61 Sheet 1B; Diagram of Safety Injection Unit 1; Revision BD

M-64 Sheet 3A; Diagram of Chemical and Volume Control and Boron Thermal Regeneration; Revision BD

M-64 Sheet 4B; Diagram of Chemical and Volume Control and Boron Thermal Regeneration; Revision H

Engineering Analyses and Technical Evaluations

GL 86-10 Evaluation BRW-29; Fire Protection Evaluation for Fire Zone 11.5-0 and 11.6-0 Boundary to Demonstrate Separation Equivalent to BTP CMEB 9.5-1, C5.b(2); Revision 0

Transco Fire Test Report TR-109; Fire and Hose Stream Tests of TCO-001 Cement; dated April 7, 1983

Transco Test Report TR-159; Fire and Hose Stream Tests of TCO-001 Cement Used in Electrical Conduit Penetrations, dated November 15, 1984

Engineering Change EC-351293; VC Duct Inspection Review; dated October 16, 2004

Design Analysis BRW-01-0293-M; Hydraulic Analysis of Fire Protection Water Supply;
Revision 0

Miscellaneous

Braidwood Letter No. BW010011; Response to the NRC Request for Additional Information to Support Resolution of Unresolved Items, Attachments 1 and 2; dated February 7, 2001

BRW VTIP MANL G080-0139; GE Testing and Maintenance of Molded Case Circuit Breakers

DIT# BRW-96-116-02; Design Information Transmittal for the Chemical and Volume Control System; dated November 14, 2000

Procedures

0BwOA PRI-5; Control Room Inaccessibility, Unit 0; Revision 101

0BwOS FP-Q5; Fire Brigade Equipment Area Check Surveillance; Revision 6

0BwVS FP.2.1.t-1; Fire Protection System Flow Test; Revision 2

1BwOA PRI-5; Control Room Inaccessibility, Unit 1; Revision 102

BwAP 1110-3; Plant Barrier Impairment Program; Revision 15

BwAr 0-37-A4; Alarm No: 0-37-A4; Revision 13

BwAr 0-39-A4; Alarm No: 0-39-A4; Revision 13

BwMP 3300-052; 18 Moth Visual Inspection of All Safety Related Fire Dampers; Revision 8

BwMS 3350-001; Semi-Annual Door Inspection; Revision 7

BwOP FP-100; Fire Response Guidelines; Revision 4

BwOP FP-100T3; 11.5-0, 401' Auxiliary Building General Area, 1D-8, 1S57, 2S-54; Revision 2

BwOP FP-100T35; Fire Zones 5.5-1 and 5.5-2 Unit 1/Unit 2 Auxiliary electrical Equipment Rooms; Revision 1

BwOP FP-100T38; Fire Zone 2.1-0, Main Control Room, 1D-75;

BwOP FP-100T48; Fire Zones 11.6-0, 11.6A-0, 11.6C-0, 426' Aux Building General Area, Lab HVAC Room and Laundry Room, 2D-75; Revision 2

CC-AA-201; Plant Barrier Control Program; Revision 6

MA-AA-716-210-1001; PCM Template for Motor Control Centers / Molded Case Circuit Breakers (MCCBs); dated January 26, 2004

MA-AA-723-325; Molded Case Circuit Breaker Testing; Revision 3

MA-BR-723-002; Smoke Detector Testing; Revision 1

NSWP-S-04; Fire Stop Installation and Inspection; Revision 1

OP-AA-201-009; Control of Transient Combustible Material; Revision 5

Self-Assessments

AR 287719; NOS Audit NOSA-BRW-05-10, Fire Protection Audit Report; dated July 2, 2005

AR 287789; Pre-Inspection Self-Assessment for NRC Triennial Fire Protection Inspection; dated May 19, 2006

LIST OF ACRONYMS USED

BTP	Branch Technical Position
CFR	Code of Federal Regulations
CMEB	Chemical Engineering Branch
DRS	Division of Reactor Safety
FHA	Fire Hazards Analysis
FPP	Fire Protection Plan
IMC	Inspection Manual Chapter
IR	Issue Report
kW	kiloWatt
LCO	Limiting Condition of Operation
MCCB	Molded Case Circuit Breaker
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
OOT	Out-Of-Tolerance
PBI	Plant Barrier Impairment
SDP	Significance Determination Process
SSA	Safe Shutdown Analysis
SSC	System, Structure, Component
UFSAR	Updated Safety Analysis Report
URI	Unresolved Item
Vac	Volts Alternating Current
VC	Main Control Room Ventilation